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PATENT SPECIFICATION

DRAWINGS ATTACHED

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COMPLETE SPECIFICATION

Improvements in or relating to Collapsible Containers for Fluids or Powders

We, INTERLUND S.A. of 4 Route de Di-vonne, Nyon, Switzerland, a corporation organised under the laws of the confederation of Switzerland, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

In the rational transport and handling of goods in factories as well as in transport from one place to another loading stools and stool-supported boxes and containers are usually used, by means of which the goods are handled in a very simple way by means of fork-lift-trucks and loading cranes. Transport of fluid is more complicated and cannot, as a rule, be incorporated in a rational transport system together with other kinds of goods. Big fluid cargoes are usually transported in tanks fixedly mounted on ships or vehicles. Transfer from one transporting means to another requires careful time planning and is in spite of that often attached to expensive periods of waiting. Finally the fluid cargoes are often dispensed into small containers as drums and similar containers, which containers when emptied require return transports. In order to reduce the cubic measurements of such return containers it is known to use bag-shaped containers made of flexible material, as rubber or plastic coated fabric, which containers when emptied are easy to flatten or roll up and which containers consequently have small cubic measurement. Such flexible containers, however, have proved to be susceptible to damage and cannot be easily handled by fork-lift-trucks and loading cranes.

The object of the present invention is to provide a collapsible container for fluid or powder permitting easy and convenient transport and handling of big fluid cargoes by use of all kinds of transport means as ships, wagons, vessels etc., which containers are adapted for easy shifting from one transport means to another by usually available loading

[Price 4s. 6d.]

means as fork-lift-trucks and loading cranes, and which containers are easily collapsible and are especially suited to changing between different kinds of fluids and powders in order to increase the rate of utilization of the containers as much as possible. According to the invention the container is composed of an outer container consisting of a bottom plate having vertical side flaps, the lower edges of which being pivotally journaled on said bottom plate to be foldable down over the bottom plate, and an inner container known per se having a bottom wall, a top wall and side walls made of flexible material, said inner container having an opening along an upper horizontal edge of the inner container, the portions of the inner container adjacent to said opening forming two lips pressed against each other and attached to the upper portion of one of said side flaps by means of detachable attachment means, in addition to which the bottom wall of the inner container is provided with a bottom opening in which an inlet and outlet pipe is inserted extending through an opening in the bottom place and having a flange sealingly pressed against the inside of the wall portion surrounding said opening in the bottom wall of the inner container.

The container according to the invention has many advantages. The container, filled as well as emptied, is very strong in mechanical respect and can easily be handled by means of fork-lift-trucks and loading cranes. Emptying of the container is facilitated by the fact that the walls of the inner container are kept strained during the emptying, and the folding down of the side flaps is easily performed owing to the fact that no manual adjustment of the folding of the walls of the inner container is necessary. At the return transports all side flaps of the container may be folded down or, alternatively, only the side flap to which the inner container is attached, in which latter case goods may be transported in the outer container. In this case it may be suitable to have

a paper or foil bag placed in the outer container prior to placing the goods in the outer container. It is also possible after emptying the inner container to retain all the side flaps in up-right position, place a paper or foil bag in the container and place light goods in the bag.

According to a preferred embodiment of the invention the inner container is attached to the outer container solely by means of said attachment means and said inlet and outlet pipe thus enabling the inner container to be easily detached from the outer container, e.g. for cleaning the inside of the walls of the inner container, the large opening along an upper edge of the inner container permitting the inner container to be turned inside out, thus facilitating the cleaning operation to a large extent. This embodiment also ensures another most important advantage, viz. the use of an insert container consisting of flexible material more thin-walled than the inner container and having substantially the same dimensions and shape as the interior dimensions and the shape, respectively, of the inner container, mounted in the inner container, attached to it and sealed by means of said attachment means and said inlet and outlet pipe. Different kinds of fluids and powder can alternatively be transported in a container without intermediate cleaning of the inner containers; only the insert container and in some cases the inlet and outlet pipe are to be changed, which is a much simpler and less time consuming operation than cleaning the inner container.

According to another important embodiment of the invention the side flap to which the inner container is attached consists of an inner side flap and an outer side flap, the outer one being pivotally connected to the bottom plate and the inner one being pivotally connected to an inner bottom plate, freely supported by the bottom plate, said inner container being attached to said inner plate and inner flap. Accordingly it is possible for an un-trained person, as occasion requires, to insert a complete inner container attached to said inner plates into an outer container, or an ordinary steel-supported collapsible container only provided with a bottom opening for the inlet and outlet pipe. At return transports all the side flaps may be folded down on the collapsed inner container. Alternatively only the inner side flap may be folded down and light goods placed on the folded down side flap. Moreover it is possible to retain all the side flaps in up-right position, lift up the inner container, place heavy goods in the outer container and place the collapsed inner container on the top of the goods.

The following is a more detailed description of a number of alternative forms of the invention given by way of example reference being made to the accompanying diagrammatic drawings in which:

Fig. 1 is a perspective side view of an outer container,

Fig. 2 is a perspective side view of an inner container,

Fig. 3 is a sectional view of the filled container along the bottom line III—III in Fig. 1,

Fig. 4 and 5 are sectional views illustrating the attachment of the inner container and an insert container to a side flap and the bottom plate, respectively,

Fig. 6 is a sectional view similar to Fig. 3 and illustrating a collapsed container,

Fig. 7 is a sectional view similar to Fig. 3 of an alternative construction and

Fig. 8 is a view, partly in section, illustrating the inlet and outlet pipe used in the construction shown in Fig. 7.

The container shown in Fig. 1 to 6 includes an outer container consisting of a bottom plate 1 having upwardly projecting edges on which side flaps 2, 3, 4 and 5 are pivotally mounted. A substantially parallelepipedal inner container made of flexible material, e.g. rubber or plastic coated fabric, is mounted in the outer container and comprises a bottom wall 6, a top wall 7 and four side walls 8, 9, 10 and 11. The top wall 7 and the side wall 11 protrude beyond the intermediate edge line of the inner container thus forming two lips 12 and 13, respectively, separated by an opening 14 into the interior of the inner container. The bottom wall 6 is provided with an opening 15 (Fig. 2) and the bottom plate 1 is provided with a corresponding underlying opening (Fig. 5). The lips 12 and 13 and the top portion of the side flap 5 are provided with a number of holes 16 and 17 respectively.

The inner container is attached to the outer container at only two specific places, viz. at the opening 15 and at the lips 12 and 13. Mounting of the inner container is performed by introducing a bottom pipe 19 provided with a flange or collar 18 into the inner container through the opening 14. The pipe 19 is then inserted into the opening 15, the corresponding opening of the bottom plate 1 and a transversal bore in the valve housing 20. By tightening a nut 21 on the end of the pipe 19, which end is plugged, the flange 18 is pressed against the inner surface of the bottom wall portion surrounding the opening 15 which portion is pressed against the inner surface of the bottom plate 1. The flange 18 is provided with diametric bores 22 connected to an axial bore 23 in the pipe 19, which pipe is provided with an opening 24 connecting the bore 23 to an inlet and outlet passage 25 in the valve housing over sealing means, not shown. The passage 25 is provided with a valve body 26.

After mounting of the pipe 19 the lips 12 and 13 are secured to the upper portion of the side flap 5 by means of a clamping bar 27 provided with mounting screws 28, which are inserted in the holes 16 and 17, after which

the lips 12 and 13 are clamped together and against the inside of the side flap 5 by tightening nuts on the ends of the screws so that a sealing of the opening 14 is obtained.

5 Before filling the container with fluid the side flaps 2 to 5 are raised and locked in upright position by means of edge plates 29 secured to the side flaps 2 and 3 and provided with locking pins 30 adapted to project into
10 holes 31 in the side flaps 4 and 5. An inlet hose is connected to the valve housing 20 and when the valve body 26 is opened, fluid is pressed through the pipe 19 into the interior of the inner container, which at filling is unfolded from the empty state indicated by a dash-dotted line in Fig. 3 to the filled state indicated by the walls 7 and 10 in Fig. 3, after which the valve body 26 is closed again.

15 At emptying the container the top wall 7 of the inner container sinks down and is successively applied against the side wall 11. Due to a certain stiffness of the walls of the inner container the discharge of fluid results in a negative pressure in the inner container causing folding of the side walls 8 and 9 inwards by suction. When the inner container is completely emptied the top wall 7 and the side wall 10 have the location indicated by the dash-dotted line in Fig. 3, the side walls 8 and 9 being folded inwards between the walls 7 and 10 and the bottom wall 6 and the side wall 11 thus preventing the occurrence of fluid filled pockets. The automatic folding is facilitated if the side walls 8 and 9 are provided with permanent folding lines. After closing the valve body 26 to prevent air from flowing into the container the side flap 5 and then the side flap 4 are folded down, after which the side flaps 2 and 3 are folded down upon the flaps 4 and 5 as shown in Fig. 6.

20 According to an embodiment of the invention the inner container is provided with an insert container easily exchangeable and adapted to the interior dimensions of the inner container. The insert container consists of a plastics foil container having substantially the same shape and size as the inner container and is partly indicated in Figs. 4 and 5, where parts of the walls 6i, 7i and 11i corresponding to the walls 6, 7 and 11 of the inner container are shown. The possibility of using an insert container is a result of the fact that according to the invention the inner container is attached to the outer container by means of the clamping means 27 and the inlet and outlet pipe 18, 19 as well as the fact that the inner container is provided with the large opening 14. Owing to these facts it is possible to introduce the insert container into the inner container and to attach the insert container in the same simple manner as the inner container by means of the clamping bar 27 and the pipe 19.

25 According to another embodiment of the invention shown in Fig. 7 and 8 the side flap 5 is provided with a loose inner flap 5i and

the bottom plate 1 is provided with a loose inner plate 1i, said inner flap and inner plate being pivotally joined by a pivot 32. The inner container (and eventually the insert container) is attached to the inner flap 5i and the inner bottom plate 1i in a similar manner as described above. To facilitate the mounting of the inner container into the outer container, however, the inlet and outlet pipe preferably is made in two parts, viz. one threaded part 33 provided with the flange or collar 18 and one threaded part 34 adapted to be screwed into the part 33 and provided with an axial bore 35 and an opening 36 adjacent to the passage 25 in the valve housing 20. The part 33 of the pipe 19 extends through the bottom opening 15 and a corresponding opening in the inner bottom plate 1i and, clamping the bottom portion of the bottom wall 6 surrounding the opening 15 between the flange 18 and the plate 1i, is secured to the plate 1i by means of a nut 37 on the under side of the plate 1i. Consequently it is possible to insert the inner container mounted on the inner plate 1i and inner flap 5i into the outer container and then connect the interior container to the valve housing 20 by the part 34 adapted to be inserted from the under side of the container through the transversal boring in the housing 20 and sealingly connect the passage 25 to the part 33 of the pipe 19.

The invention is not limited to embodiments shown but a number of modifications are of course possible within the scope of the invention.

The dimensions of the container are suitably adapted for transport on ships, railways as well as lorries. A suitable dimension is length 1 600 mm, width 1 175 mm and height 1 100 mm. In this case the volume of the container is about 1 600 litres, i.e. a volume corresponding to eight drums of each 200 litres. The height of the collapsed container is only 350 mm.

WHAT WE CLAIM IS:—

1. A collapsible container for fluid or powder, characterized in that the container is composed of an outer container consisting of a bottom plate having vertical side flaps the lower edges of which are pivotally journaled on said bottom plate to be foldable down over the bottom plate, and an inner container having a bottom wall, a top wall and side walls made of flexible material, said inner container having an opening along an upper horizontal edge of the inner container the portions of the inner container adjacent to said opening forming two lips pressed against each other and attached to the upper portion of one of said side flaps by means of detachable attachment means, in addition to which the bottom wall of the inner container is provided with a bottom opening in which an inlet and outlet pipe is inserted extending through an opening in the bottom plate and having a flange sealingly pressed against the inside of the wall portion

surrounding said opening in the bottom wall of the inner container.

- 5 2. A collapsible container as claimed in claim 1, characterised in that the inner container is attached to the outer container solely by means of said attachment means and said inlet and outlet pipe.

- 10 3. A collapsible container as claimed in claim 1, or claim 2, characterised in that an insert container consisting of flexible material more thin-walled than the inner container and having substantially the same dimensions and shape as the interior dimensions and the shape, respectively, of the inner container is mounted
15 in the inner container attached to it and sealed by means of said attachment means and said inlet and outlet pipe.

4. A collapsible container as claimed in any

one of the preceding claims, characterised in that the side flap to which the inner container is attached consists of an inner side flap and an outer side flap, the outer one being pivotally connected to the bottom plate and the inner one being pivotally connected to an inner bottom plate freely supported by the bottom plate
20 said inner container being attached to said inner plate and inner flap. 25

5. A collapsible container substantially as hereinbefore described with reference to and as illustrated in Figures 1 to 6, or Figures
7 and 8 of the accompanying drawings. 30

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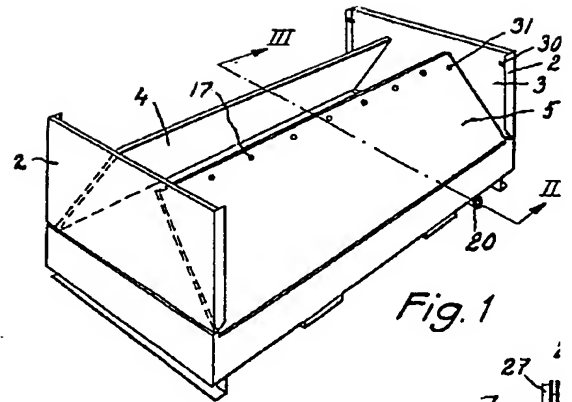


Fig. 1

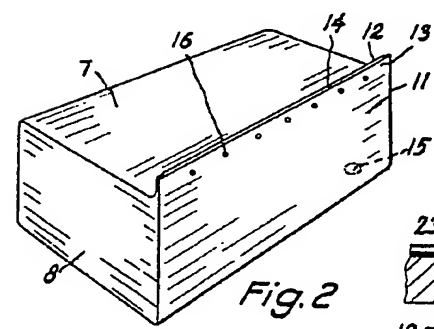


Fig. 2

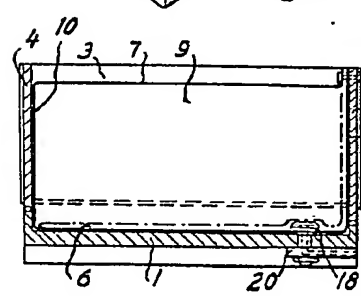


Fig. 3

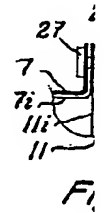


Fig. 4

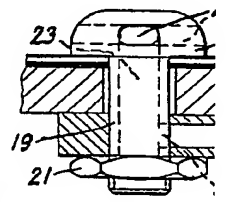


Fig. 5

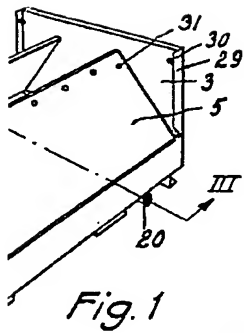


Fig. 1

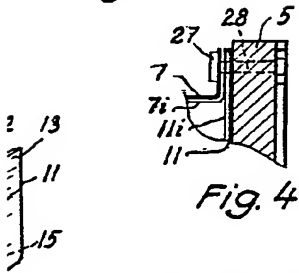


Fig. 4

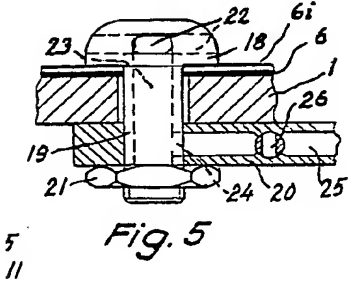


Fig. 5

Fig. 3

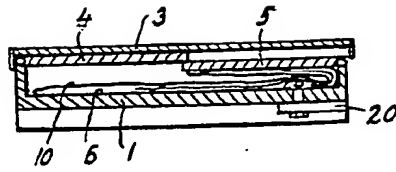


Fig. 6

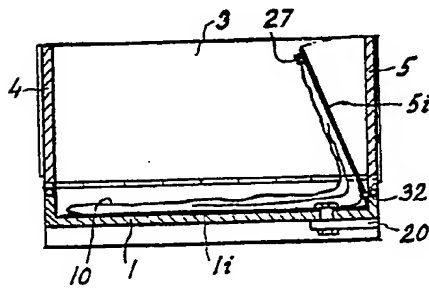


Fig. 7

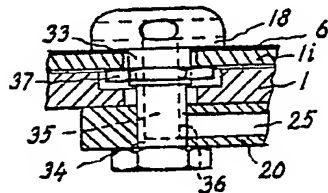


Fig. 8

